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HALLUCINOGENIC FUNGI

NORTON H. NICKERSON

ONE of the more interesting bits of knowledge which is a part of the science of botany concerns the property of certain toadstool-like or mushroom-like fungi to induce hallucinations in the minds of human beings who consume them. Although there is only little literature on the subject, one work stands out for those who are interested but who are not mycologists (specialists in fungi); it is a book entitled "Mushrooms, Russia and History"* by Valentia P. and R. Gordon Wasson. Printed in a limited edition of 512 copies in 1957, this two-volume work is a "labor of love" written, in the words of the authors, "for connoisseurs of edible mushrooms by amateurs." It traces, among other things, the role played by mushrooms in the daily lives of the various European peoples, especially their use as foods and in the folklore of the country. Delving into many other aspects, the books cover etymologies of words such as "mushroom," "toadstool" and "mycology," suggesting at one point that the hallucinatory properties of mushrooms, known to the ancient Greeks as "mycos," may have provided the basis for our words "mystery" and "miracle," by freeing the imagination of prehistoric man. This account draws heavily on their book, both because of the personal experiences which they relate and the work to which they have gone in assembling references from many different sources.

One of their conclusions is that the mushroom, fly amanita *(Amanita muscaria)* of Europe and Asia, often considered poisonous, is instead an inebriant, and of only doubtful value in the killing of flies. The secret of these mushrooms was apparantly lost from Europe long ago, but it still lingers on as an aftermath of an ancient tabu in the words "toadstool" in English, "God's food" in Greek and "devil's bread" in Flemish.

For us in America, there is special meaning in the Wassons' studies, because their search carried them deep into the hinterlands of Mexico in the hope that they would be able to find out the truth of statements in some of the old Spanish codices (records of the early American civilizations often composed with great care by the friars who were sent among the natives from Spain's church) that there exists today a living cult of sacred mushrooms. Ten such early references attest to this use of mushrooms, but in 1915, W. E. Safford, addressing the annual meeting of the Botanical Society of America in Washington, D. C., vehemently denied their existence. He

*Pantheon Books, Inc., New York.

insisted that what had really been referred to were dried cactus buttons (peyote). His attitude provoked an immediate search by people who felt that the early writers would most definitely tell dried cactus buttons from mushrooms, and in 1936, Robert J. Weitlaner rediscovered these curious mushrooms. His specimens belonged to the genus *Panaeolus campanulatus* var. *sphinctrinus*. The first modern-

P.A.D.

Jean-Henri Fabre, *Panaeolus campanualtus* Fr. ex L.

known mushroom rites were attended by 4 white persons in 1938, but were only sparsely written up as regards the divine mushrooms. The Wassons wondered whether there were other divinatory mushrooms, possibly of different genera and species. Correspondence with one Miss Eunice Pike provided them with much valuable insight on how the native Mazatec Indians regard the (for them) sacred mushrooms. The Wassons' reaction to her letter was to journey themselves to the town of Huautla in the state of Oaxaca, where they hoped to witness the rites, collect the fungus involved and possibly try consuming the mushrooms themselves. Their journey was like many taken to remote corners, where one after another the more modern modes of transportation give way to those far more primitive. After their arrival, in August 1953, a week followed during which they were brought several kinds of divine mushrooms and were told by various villagers of the folklore connected with their use.

Just before the day of scheduled departure, and when they had about given up hope of ever having any chance to learn anything further, they discovered that their guide was a *curandero,* or "wise man," who often conducted the very ceremonies they wanted so much to witness. He agreed to help them that night. They made careful notes of all ceremonial items, including cacao beans, hen's eggs, brilliant feathers, maize kernels, fourteen pair of sacred mushrooms and the order in which they were employed. The 14 pairs of mushrooms were consumed within one half hour by the *curandero.* The Wassons had asked for knowledge of their son, whom they believed to be in Boston at that time. Don Aurelio, the *curandero,* informed them that their son was in New York, not Boston; that he would be sent to war possibly to Germany; that he was in mental turmoil, but thinking of his

parents. Later that same evening, he told Mr. Wasson that a relative of his was destined to fall seriously ill within the year. The session, which began at 9 P. M., ended at 2:30 A. M. Next morning, the Wassons were on their way back to New York. They dismissed the *curandero's* predictions as thin examples of divinatory power, but then recorded the following. Their son had been in New York, not Boston, when they were in Mexico attending the mushroom rites. Later in the fall, the boy enlisted in the army, prompted by an emotional crisis which had been fomenting while his parents were in Mexico. He was later sent, however, to Japan and not to Germany. Within six months, one of Mr. Wasson's first cousins, in good health and in his early forties, died of heart failure. The Wassons make no further comment on these facts beyond recording them.

In 1955, they visited another Mazatec village, and were privileged to partake in another ceremony, with a *curandera* (wise woman) officiating. She offered Mr. Wasson six pair of mushrooms, which of course thrilled him, since the moment represented a dramatic culmination to his years of pursuit of the sacred mushroom cult. He records the taste as being acrid and unpleasant. About an hour after eating the mushrooms, Wasson and his companion (also from New York) began to see visions. He records his experiences, often in the third person, as follows:

> There is no better way to describe the sensation than to say that it was as though his very soul had been scooped out of his body and translated to a point floating in space, leaving behind the husk of clay, his body. Our bodies lay there while our souls soared. We both felt nauseated . . . , but these episodes seemed of no moment. At first we saw geometric patterns, angular not circular, in richest colors, such as might adorn textiles or carpets. Then the patterns

Ceremonial Mushrooms *Stropharia cubensis* Earle P.A.D.

grew into architectural structures, with colonades and architraves, patios of regal splendor, the stone-work all in brilliant colors, gold and onyx and ebony, all most harmoniously and ingeniously contrived, in richest magnificence extending beyond the reach of sight, in vistas measureless to man. For some reason these architectural visions seemed oriental, though at every stage RGW pointed out to himself that they could not be identified with any specific oriental country. They were neither Japanese nor Chinese nor Indian nor Moslem. They seemed to belong rather to the imaginary architecture described by the visionaries of the Bible. In the æsthetics of this discovered world Attic simplicity had no place: everything was resplendently rich.

At one point in the faint moonlight the bouquet on the table assumed the dimensions and shape of an imperial conveyance, a triumphal car, drawn by living creatures known only to mythology. With our eyes wide open, the visions came in endless succession, each growing out of the preceding one. We had the sensation that the walls of our humble house had vanished, that our untrammeled souls were floating in the universe, stroked by divine breezes, possessed of a divine mobility that would transport us anywhere on the wings of a thought.

A few nights later, again taking mushrooms in the same room, Mr. Wasson reported that his visions were different. To quote again:

There were no geometrical patterns, no edifices of oriental splendor. The patterns were replaced by artistic motifs of the Elizabethan and Jacobean periods in England—armor worn for fashionable display, family escutcheons, the carvings of choir stalls and cathedral chairs. No patina of age hung on them. They were all fresh from God's work-shop, pristine in their finish. The beholder could only sigh after the skill that would have fixed those beauteous shapes on paper or in metal or wood, that they might not be lost in a vision. They too grew one out of the other, the new one emerging from the center of its predecessor. Here as in the first night the visions seemed freighted with significance. They seemed the very archetypes of beautiful form and color. We felt ourselves in the presence of the Ideals that Plato had talked about. In saying this let not the reader think that we are indulging in rhetoric, straining to command his attention by an extravagant figure of speech. For the world our visions were and must remain "hallucinations." But for us they were not false or shadowy suggestions of real things, figments of an unhinged imagination. What we were seeing was, we knew, the only reality, of which the counterparts of every day mere imperfect adumbrations. At the time we ourselves were alive to the novelty of this our discovery, and astonished by it. Whatever their provenience, the blunt and startling fact is that our visions were sensed more clearly, were superior in all their attributes, were more authoritative, for us who were experiencing them, than what passes for mundane reality.

And what of the aftereffects? Mr. Wasson reports that on both occasions he fell asleep about 4 A. M. and awoke about 6 A. M. with a completely clear head and full memory of all that was said or that he had imagined during the previous night. Apparently the mushrooms are not habit forming, nor does use of them affect one's threshold of tolerance. There is a consistent but often different number of mushrooms needed by different people to obtain the same effect.

This short account is again evidence that archaic peoples often possess knowledge of plants for which we, in our preoccupation of doing things "our" modern and scientific way, have seldom given them credit. Fortunately, the search for new drugs in the juices of time-honored plants of primitive societies ranging from the *curare* poisons of South America to the reserpine-bearing *Rauwolfia* of India, is well under way. The Nahuatl (Aztec) word for these divine mushrooms is *teonanácatl*, translated "God's flesh." There may yet be more truth than poetry in this ancient name. We may expect news in the near future of drugs isolated from hallucinogenic and possibly other fungi which may prove useful in treating psychotic disorders of all sorts.

THE TREE OF HEAVEN, *AILANTHUS ALTISSIMA*

I. A Blessing and a Curse

EDGAR ANDERSON

It was 210 years ago that Father d'Incarville, a missionary priest, gathered seeds of this Chinese tree in Nanking and forwarded them to his English correspondent, Peter Collinson. In the two intervening centuries the tree has gone in and out of fashion. It has been more highly praised and more roundly damned than any other tree. Tolerant of smoke, thriving in spite of neglect, it has sown its seeds in slum areas and industrial districts from Boston to Atlanta. It is indeed "the tree that grew in Brooklyn" and before smoke control changed St. Louis gardening patterns, it became the prevailing, and in many neighborhoods the only, tree from Kingshighway to the Mississippi River.

For a time it seemed to have industrial possibilities; since its leaves are eaten by the larvæ which produce one of the tough "pongee" silks, it was the subject of extensive silk production experiments in France, Algeria, and the southern United States.

Branch with Fruit
PHOTO BY E.L.E

Before the nature of malaria was understood, Ailanthus was ballyhooed for intensive planting along city streets to absorb noxious vapors and thus promote the health of the citizens. When epidemics persisted in spite of mass plantings, it was then suspected of causing them. "Might not this tree which so fully absorbs poison, also throw off toxic effluvia? May it not store up the noxious gases and again let them forth in the flowering season?" Though today these ideas strike us as fantastic, now that it is widely understood that malaria is a disease due to parasites in the blood stream, spread by mosquitoes, they did not seem unlikely when it was generally thought that malaria was the result of breathing in bad air. As a generator of unpleasant odors, Ailanthus is outstanding among our foliage trees. All parts of the tree have a foul odor when crushed and during the flowering season in early summer, the male trees can be smelled at a considerable distance. So well known is this unpleasant characteristic that instead of "Tree of Heaven" the common name in certain areas is "Stinkwood" or "Stink Tree."

An even more serious objection is the amazing capacity to spread both by seed and root. The seeds occur in great shaggy masses and break away at

various times during the winter and spring. Each seed is set in a curving papery wing about two inches long and a quarter of an inch wide. It blows long distances in a high wind; it whirls gracefully downward in quiet air; it can skid rapidly along over the surface of the snow or along a smooth sidewalk; it also floats effectively in the merest trickle of water; it is planted far and wide and has a special capacity for getting down in between stone blocks or between a building and an adjacent pavement.

Gardeners who live within a block's distance of a fruiting tree learn to keep a sharp eye out for the distinctive seedlings. They not only spread into flower beds but they have a disturbing habit of coming up among the shrubbery where it takes a sharp eye to spot the seedlings while they are still small enough to remove readily. They grow rapidly in hot weather (frequently well over a foot the first season) and soon reach the stage where they merely break off when an attempt is made to remove them. They then come back again and again from the same root, usually gaining a little root strength with each attempt to dislodge them, until it takes a major operation to get them out of the shrubbery.

Volunteer Tree showing habit of growing near foundations. PHOTO BY E.L.E

It is not until one makes a careful study of the Ailanthus trees he comes across, that he gradually realizes what a very great proportion of them in the eastern United States are self sown. Most other trees one sees in the city are obviously planted; they occur along the sidewalk in formal rows, they are set out in matched pairs in front yards, they are nicely placed with due relation to the house and the garden. These are the very places in which Ailanthus trees are seldom or never found. They are commonest along the boundary fences between one piece of property and the next; there are more of them along alleyways than along streets; they rise out of clumps of shrubbery or grow slantwise next to a building or a wall. They frequently come up between the backfence and the alley or alongside the garage or an old ashpit. The Ailanthus which did not volunteer and was obviously purposefully planted in the place where you find it, is very much the exception.

Some of the most amazing Ailanthus trees are those which have been vigorously cut back or dehorned. The new sprouts frequently grow five to ten feet a year under such treatment and

produce weird plumes of foliage during the summer, followed by gaunt, stiff skeleton branches the following winter.

If Ailanthus trees spread only by their seeds they could be something of a nuisance; it is their ability to come back vigorously from root sprouts that can make well-established trees a real problem when it comes to removing them. If an old tree is cut down it can sprout back vigorously from the root, not only right next to the stump but even a hundred feet or more away. If conditions are just right, up come dozens of young trees scattered over a considerable area. Unless vigorous and intelligent steps are taken, one will have an Ailanthus thicket for many years to come. It is best to wait until the sprouts are well-developed and then spray them with a brush-killing herbicide. The induced abnormal growth will cause the sprouts to die back but usually this is not enough to eliminate the roots completely. The treatment may have to be repeated for a second or even a third time.

The problem with Ailanthus therefore is that the tree has the capacity for becoming a real weed, spreading into areas where it is not wanted and from which it can be dislodged only with persistent effort. It has the further disadvantage of being brittle, thus breaking easily in a wind storm.

On the positive side, it is a handsome tree which will endure smoke and neglect. Hundreds of thousands of city dwellers, particularly those in downtown areas, would have no shade for their homes if it were not for Ailanthus. The red-fruited variety (rarely seen in the eastern United States) is spectacularly beautiful over a period of months each year. City parks are much more attractive where Ailanthus has been wisely used. It has been established around the rocky areas in Central Park very effectively and in the St. Louis zoo it is the principal tree around animal houses and in the animal yards. For all its faults, it has certain rare advantages. It may be a curse at times, but it can also be a blessing.

THE SCENT OF THE UPLAND BONESET

In the late summer the gray-white flowers of the upland boneset *Eupatorium altissimum* give a shaggy look to many of our Missouri fields. The plants branch widely and are covered with flower heads whose rich honey-like scent is one of the sweetest in any of our native wild flowers.

AN INVITATION TO SUGGEST NAMES FOR CLIMATRON FEATURES

THE lack of specific names for the different paths, walks, planting areas and ponds, is a handicap for all those working daily in the Climatron. The botanist on a collecting trip can say that he found a plant along the road to Mandalay, or on the seventh hill in Rome, or off the Alaskan Highway, but it sounds awkward to explain the corn in the Northwest sector and in the Southeast sector of the Climatron. How much nicer it would be to talk about the ginger on Misty Ridge, or the silk oak on Emerald Mountain.

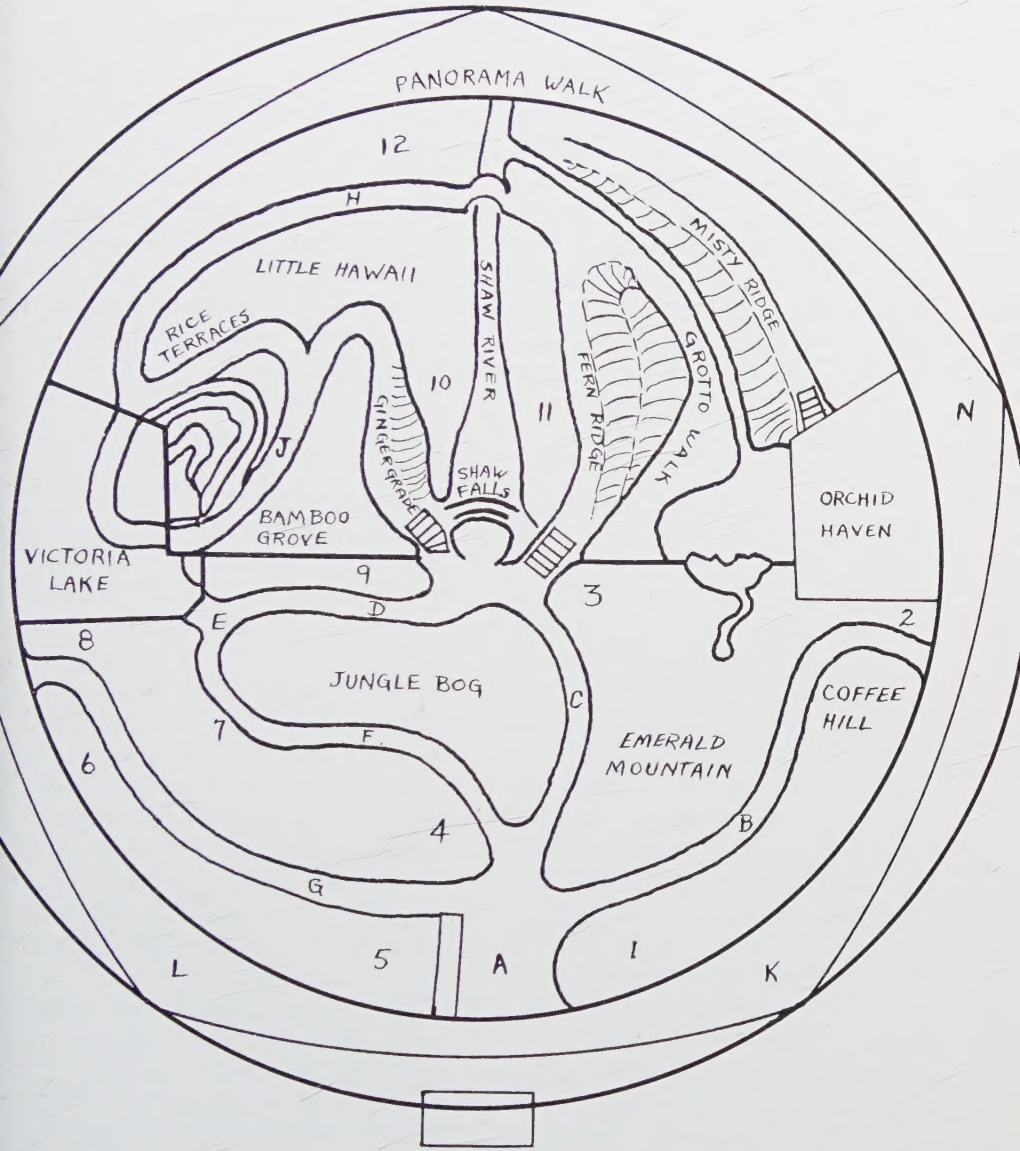
Definite areas with some suggested names are indicated in the accompanying sketch of the Climatron. The areas and the paths for which we should like to have names are indicated by numbers. Everyone is invited to think up the most interesting and catchy names for each of these areas and paths, and to send them to the Editor of the BULLETIN. You also may suggest new names for the areas which are already indicated by a name.

A small group of staff members of the Garden will review names which have been proposed and we promise to every person who has suggested a name which is accepted, a special orchid corsage to be delivered at the time of the preview for the Chrysanthemum Show. The names will be judged partly on the basis of euphony and appropriateness, but they also should suggest romance, mystery or any other quality which would make one long to visit the Climatron when such a name is mentioned. "Misty Ridge" on a hot summer day might evoke thoughts of coolness. "Floating Rock Pond" is both descriptive and appealing, "Victoria Lake" refers to the Victory Regia to be grown in it, but another name stressing the under-water walk might be better.

Everyone, including Garden employees, may compete for these prizes but we suggest that you get your inspiration for a new and catchy name, by walking through the Climatron frequently.

It should be made clear that in the course of the next few years fairly big changes will be made in the layout of the lower levels of the Climatron. The map shows that the center, where now the portico from the palm house was left standing, will be redeveloped into a rather craggy mountain from which a big waterfall will drop down. It should be big enough so that one can walk behind the water curtain. On each side of this mountain a long ridge will gradually grade down to the lower level with a more or less naturalistic set of steps instead of the formal stairs which are there at present. It seems appropriate to call this mountain "Shaw Mountain" and the waterfalls "Shaw Falls," but perhaps another name will be proposed. So now, go and get at it—this will be fun!

F.W.W.



PLAN OF THE PRESENT AND PROPOSED PLANTINGS IN THE CLIMATRON

Letters refer to Paths and Walks to be Named

Numerals refer to Planting Areas to be Named or Renamed

HAY FEVER

JAMES A. DUKE AND J. TED BEST, M.D.

SIGHS of relief may be heard as the crisp autumn breezes cool the long suffering brows of summer. But among the sighs of the pleased may be heard the sneezes of those who don't appreciate the autumn breezes. These few are those who are suffering through the last of the three hay fever seasons, and although we have never experienced hay fever ourselves, we are led to believe that those who do are looking forward to winter when the flowers are no longer producing their pollen.

Hay fever knows three main seasons, the early spring, the early summer and the early fall. The first season corresponds with the flowering time of many of the wind-pollinated trees such as oak, elm and box elder, all of which abound in the St. Louis area. The early summer season corresponds to the flowering period of the grasses. The last season, which concerns us today, corresponds with the flowering period of several weedy elements of the Missouri flora. Just as the summer season has been blamed on the rose, the fall season has been blamed on the goldenrod, which is one of the most conspicuous flowers of that season.

It is true that if a sufferer should smell a rose or a goldenrod, at close range, he would in all probability, exhibit the symptoms of an attack, but both these plants are insect-pollinated. The real culprits are wind-pollinated plants whose flowers are inconspicuous and not attractive to people or to insects. To compensate for this they produce astounding quantities of nearly weightless pollen which is carried for great distances by the wind. By way of contrast, insect-pollinated plants generally produce lesser quantities of pollen which is heavier and more oily. In addition to the oil, many of them have spines which make them more likely to become attached to the marauding insects.

Pollen, although not in itself truly sexual in nature, is a minute cell produced by the stamens of the plant. Sperm are produced after a few nuclear divisions, some of which may take place while the pollen is still in the anther of the stamen, the remainder taking place after the pollen has been transported by one agent or another to the female parts of the flower. Although minute, the proteinaceous pollen grains often have very ornate walls, being provided with variously shaped spines which may aid in their dispersal. Although other agents such as dust, powder and lint, may be effective in inducing the symptoms of hay fever, pollen is one of the more common agents in autumn.

For a better understanding of hay fever, we should first understand a few of the principles of allergies.

Allergy or hypersensitivity in man is an adverse reaction produced by exposure to a foreign substance (antigen) following an initial or sensitizing contact. The body's response to such a contact is to produce a substance (antibody) which is capable of "neutralizing" the antigen. When the antigen and antibody unite within or

on the surface of the cell, histamine or a similar acting substance is released which in turn reacts on the cells of the shock organ (lungs, blood vessels, or in the case of hay fever on the mucous membranes of the upper respiratory tract). Thus, contact with an antigen which is usually protein in nature is a prerequisite for development of allergy, and hypersensitivity reactions are elicited only by re-exposure to the antigen or some closely related substance. Hypersensitivity itself is not inherited but the existence of a genetic predisposition to development of allergy seems firmly established.

Hay fever is an allergic disease of man characterized by sneezing, copious mucus discharge from the nose, and itching of the eyes, often accompanied by tear formation. It is usually seasonal since sensitivity to air-borne antigens, particularly pollens, is by far the most common cause. The diagnosis is established when, by injecting under the skin small amounts of extracts from various of the common offenders, a reaction is obtained to one of the substances known to be present in the atmosphere at a time when the patient displays symptoms. The most important single preventative measure would be to remove the antigen from the patient's environment or conversely, to remove the person from the environment of the antigen, but this is usually unfeasible or impossible. Small amounts of the offending antigen may be injected into the patient over a long period of time until all the offending antibodies are removed from free circulation within the blood. Any additional antigens can find no antibodies to react with as they have all been neutralized in antigen-antibody reaction. Although this is theoretically sound, clinically it is often unsuccessful and indeed may be also unfeasible as most people are not sensitive to one but many substances. In the acute attacks antihistamines are used to counter the effects of the histamine-like substances released in the antigen-antibody reaction. Adrenal steroid hormones such as cortisone afford relief through their anti-inflammatory activity. The use of such powerful drugs is deplored by many physicians because hay fever is a benign disease, principally uncomfortable and annoying to the afflicted person, but never fatal.

Although the hay fever sufferer will certainly not wish to study his enemies at close range, he should be able to recognize them so that they might be avoided. The worst offender in the fall season are inconspicuous weeds, close relatives of the more striking goldenrod. Most common in Missouri are the ragworts or ragweeds *(Ambrosia)*, the cockleburrs *(Xanthium)*, the marsh elders *(Iva)*, and the burr ragweeds *(Franseria)*. These are all members of the aster family which has some of the most complicated flower-arrangements in existence. The intricacies of these flowers was the subject of an article in the April issue of the BULLETIN. The principal fall hay fever plants may be distinguished by the key below.

a. Flower heads without spines, not burr-like ..... Iva
a. Flower heads with spines, burr-like.
  b. Spines all pointing in one direction ..... Ambrosia
  b. Spines pointing in all directions.

c. Leaves fern-like; burrs ca. ¼ inch long ..... Franseria
c. Leaves maple-like; burrs about an inch long ..... Xanthium

1. *Iva:* Marsh Elder. These are shrubby plants which differ from the following in having both male and female flowers in the same flower cluster. Three species are common in Missouri: *Iva angustifolia,* with willow-like leaves, *Iva annua* with leaves shaped like an elm but with fewer teeth, and *Iva xanthifolia,* with maple-shaped leaves. The heads which are not burr-like at all, are in spike-like inflorescences in the first two species, but they are in broad branching inflorescences in *Iva xanthifolia.* The pollen grains have small spines and are about 20 microns in diameter. All the Missouri species are hay fever agents.

2. *Ambrosia:* Ragweed. The ragweeds are perhaps the worst offenders in Missouri. They often form dense head-high thickets; brushing through them could prove disastrous to the hay fever sufferer. Four species are common in Missouri and they can usually be distinguished by the leaves. *Ambrosia artemisifolia* and *A. psilostachya* have fern-like leaves, but in the latter, the upper surface of the leaves are harsh to the touch and the fruits rarely have tubercles at the tip. In the former, the leaves are not harsh to the touch and the fruit is crowned by 4–7 spines all oriented in the same direction. *A. trifida* has broad leaves which are three-lobed whereas *A. bidentata,* with which it hybridizes, has narrow willow-like leaves which often have a couple of minute teeth at their base. The pollen grains of these forms are about the same size as those of *Iva* but the spines are not so prominent. The male and female heads occur in separate clusters on the same plants, the male heads which produce the pollen being terminal on the spike-like branches of the inflorescence.

3. *Franseria:* Burr Ragweed. As the true ragweeds, the burr ragweeds are serious sources of irritation. They closely resemble the true ragweeds in many respects, but the spines on their burrs tend to be oriented in a less orderly fashion. I have seen specimens of only one species, *Franseria acanthicarpa,* from Missouri, but members of this genus and other related genera may appear as weeds rather spontaneously; e.g. *Franseria discolor,* normally of more western distribution, may have established itself in Illinois. The pollen grains are about the same size as those of the preceding genera but the spines are smaller and tend to be more remote from each other. The culpable male heads tend to be located at the ends of the branches, above the burrs, which are in turn located in the axils of the uppermost fern-like leaves.

4. *Xanthium:* Cockleburr. Offensive in more ways than one, the cockleburrs are heavy pollen producers, serious weeds in cotton and corn fields, and too many of us know how annoying they can be as they cling to the socks. The spines on the burrs have minutely but obviously recurved tips which tend to hook into fur or clothing. The efficacy of this means of seed dispersal is reflected by the wide distribution of these species, several of which have been introduced from other continents.

1. *Iva* Marsh Elder

2. *Ambrosia* Ragweed

3. *Franseria* Burr Ragweed

4. *Xanthium* Cockleburr

PHOTOS BY K.O.P.

Xanthium italicum and *X. chinense*, two of the many species found in Missouri, serve by their names alone to suggest the ubiquity of cockleburrs. The pollen grains in many cases are half again as large as those of the preceding genera, but the size and placement of the spines tend to vary, in some being larger and farther apart, others approaching those of the previ-

ous genera in their size and distribution. The leaves of these plants are different from any of those (except *I. xanthifolia*) in being more or less like a maple. In the boot-heel of Missouri, the leaves of this weedy plant closely resemble those of the cotton, which it often crowds rather deleteriously. As a rule, the male inflorescences are borne on different branch systems of the same plant. Our species are mostly annual, and were it not for an annual increment of seeds, they could soon be eliminated. Nevertheless, it remains one of the worst of Missouri weeds and a real nuisance to the hunter and naturalist, whether he has hay fever or not.

BOOK REVIEW

Gardens in Winter, Elizabeth Lawrence, 218 pp., $4.50, Harper & Bros. 1961.

Some years ago Miss Lawrence wrote a book called *A Southern Garden,* largely about her own garden in Raleigh, North Carolina. One section described her attempts to find hardy things which would flower late in the fall and early in the spring as well as to locate genuine winter-flowering species such as the Ozark Witch Hazel, *Hamamelis vernalis.* Her description of her successes and failures was so fascinating and so filled with odd bits of information, practical and otherwise, about these unusual and mostly little known plants, that many of her readers became personal friends, at least by correspondence. In the meantime *A Southern Garden* has gone out of print (though it won the Herbert Medal), Miss Lawrence has moved from Raleigh to Charlotte, and has contrived another garden with a strong accent on winter bloom. During all this time her correspondence with other enthusiastic gardeners has continued, so that she writes not merely in terms of her own two North Carolina gardens but with many a detailed reference to the experience of Carl Starker in Oregon, Mr. Krippendorf in Cincinnati, and Caroline Dorman in Louisiana. These and a host of other friends appear on page after page, their experiences and their likes and dislikes, compared and contrasted with her own.

It is doubtful if a horticultural book more truly national in tone and content has ever been produced in this country. St. Louisans interested in gardening throughout the year will be envious of her experiences in Raleigh and Charlotte where cold waves arrive more gently and occur less frequently than with us. Though our best gardeners can read it with profit, large parts of Miss Lawrence's new book, *Gardens in Winter,* must remain for us something of a dream book, a mark to shoot at. She writes for instance of *Mahonia Bealei*: "With me the flowers usually begin to open in late January * * * They are never frost bitten." A St. Louisan knows that though a light frost does not injure them, they are killed outright by a heavy freeze. My own plants are in a sheltered spot, yet in many seasons the flower buds are gone before they open and in more

favorable years I have had to be content with fleeting glances of their fragrant pale yellow beauty and to be thankful that the handsome holly-ish leaves have never yet been injured.

Along with enthusiasm and vivid description, moreover, a lot of honest practical advice is packed into this little book of 218 pages. In her discussion of the winter aconite, for instance, it is helpful (and comforting) for those of us who have more or less failed in establishing this beautiful winter flower in our gardens, to read, "Once well started, the winter aconite is in the garden for life, but getting it above the ground the first time is not so easy. The problem is to get fresh tubers, for they suffer if they have been allowed to dry out. Mine came from Mr. Krippendorf, who sent them in bloom; great clumps cut like turf, with the woods earth undisturbed. Caroline's came from Alexander Heimlich (in Massachusetts) who keeps his tubers in damp peat moss until they are shipped. Sometimes it is hard to tell the top of the tubers from the bottom. Putting them in edgewise seems to solve this problem. Aconites want some shade and they do well under tall trees, where they should be planted by the hundreds to make a sheet of early bloom."

Gardens in Winter is attractively printed, with 27 line drawings by Caroline Dorman, which combine botanical understanding with gardening insight and decorative charm. There is a full index, not only to the plants but to the regions about which there is definite information and to the many friends and authorities who are quoted. There is an imaginative list of suggestions for winter reading and two full pages of addresses of the firms (some large, some very small) who can supply plants, bulbs, and seeds.

E. A.

MISSOURI BOTANICAL GARDEN PROGRAMS

For Further Information Telephone TOwnsend 5-0440

Special Shows and Displays

Greater St. Louis Cactus Show, September 2 through 10.
St. Louis Horticultural Society Harvest Show, September 16 and 17.
Midwest Dahlia Show, September 23 and 24.
Live Concert in the Knolls by a Chamber Group of the St. Louis Symphony Musicians, October 14

Free Nature Programs for Children, aged seven and over, are held every Saturday morning from 10:00 to 11:30 A. M. Meet in Museum Bldg.

September 2 Plants for the House
9 Hundred in One Flower
16 Color Sound Movies
23 The Devil's Footstools
30 From Dust to Seed

COURSES FOR ADULTS beginning in September and corrections for those beginning in October.

105 How to Propagate from Cuttings—5 sessions—fee $12.00.
Tuesdays October 17 to November 14—8:00 to 9:30 P. M.
Thursdays October 19 to November 16—1:00 to 2:30 P. M.
Fundamental facts and procedures for producing trees, shrubs, and perennials from cuttings (asexual reproduction). The Garden will supply one plastic covered metal propagating flat, media and plant materials for 40 to 50 kinds of plants.

107 Bulbs, Indoors-Outdoors—2 sessions—fee $8.00.
Tuesdays October 3 and 10—8:00 to 9:30 P. M.
Thursdays October 5 and 12—1:00 to 2:30 P. M.
Instruction on bulb forcing and outdoor bulb culture will be given. The Garden will supply each student with 24 top quality bulbs in 7 inch clay pans which may be taken home. The Garden will also provide space for the cool treatment which the forced bulbs require.

108 House Plants—3 sessions—fee $6.00.
Thursdays October 5, 19 and 26—8:00 to 9:30 P. M.
General instruction in kinds of house plants, care and growing requirements such as heat, light, water and fertilizer will be given. Attention will be given to individual home problems.

205 Field Botany—Fall—3 sessions—fee $6.00.
Saturdays September 23, 30 and October 7. Start from the Garden—10:00 A. M.
Field courses are designed to enable the student to recognize common wild flowers and weeds in the Fall, and to understand plants' relationship to their environment.

207 Mosses and Ferns—5 sessions—fee $10.00.
Wednesdays October 4, 11, 18 and 25, November 1—8:00 to 9:30 P. M.
General instruction in mosses and ferns. Participants will learn how to indentify and to recognize the common kinds. Two sessions will be field trips, to be arranged.

SPECIAL CLASSES

Painting Classes; oils, casein, watercolors. Mrs. Margery Dodson Imster, Instructor. Fee $16.00. September 6, 13, 20 and 27. 9:00 A. M.

Flower Preserving Classes; a new method of preserving flowers and foliage to look fresh and to last indefinitely. Mrs. Roy Gaertner, Instructor. Fee $5.00. September 12, 19, 26 and October 3. 10:00 A. M. Museum Building.

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical (Shaw's) Garden was established in 1859 by Henry Shaw, a St. Louis businessman, to be controlled by a Board of Trustees for the public benefit. The Garden is a non-profit institution which receives no support from the city or state, depending on the income from the Shaw estate supplemented by contributions from the public.

The old stone walls and cast-iron fences, the Linnean House, the Museum Building, the part of the Administration Building which was Shaw's Town House, relocated in the Garden in 1890, and the Tower Grove House, his country home, all date from Mr. Shaw's time. The Main Gate, display and growing greenhouses and most other facilities date from the period immediately following the turn of the century. The Climatron, opened in 1960, is the first of several new buildings planned for the Garden's redevelopment. It is the world's first geodesic dome, fully climate-controlled greenhouse and contains the Garden's tropical collections.

The Garden—70 acres—is open every day of the year from 9:00 A. M. until sundown; the greenhouses 9:00 A. M. to 5:00 P. M.; the Climatron Monday through Thursday 9:00 A. M. to 6:00 P. M., Friday through Sunday 9:00 A. M. to 10:00 P. M. (April through October); Tower Grove House is open daily from 10:00 A. M. to 4:00 P. M. (December to March on weekends only). The Display House presents four seasonal displays: November, Chrysanthemums; December, Poinsettias; February, Orchids; Spring, Lilies and other flowers. During the year are other shows, competitions and festivals sponsored by various Garden Clubs and Flower Societies.

Courses in Botany and Horticulture for adults are conducted by the Garden staff. Children's nature studies are provided each Saturday of the year and a special nature program is held during the summer. Information on these activities is published in the BULLETIN or may be had by mail or phone. The Garden maintains a research program through the Henry Shaw School of Botany, Washington University.

In 1926 an Arboretum — 1600 acres — was established at Gray Summit, Missouri. Foot trails and roads pass through the Arboretum and are open to visitors in April and May.

The Garden Administration Building is located at 2315 Tower Grove Ave., and the Garden main entrance is at Tower Grove and Flora Place. The entrance at Tower Grove and Cleveland Avenue is also open to the public. The Garden is served by both the Sarah (No. 42) and the Park-Southampton (No. 80) city bus lines.

Persons interested in helping to support the Garden and taking part in Garden activities are urged to do so through the "Friends of the Garden". Information may be obtained from the Main Gate or by mail or phone.